

## Recovery Plan Action Status

**Plan Name:** Revised Recovery Plan for Sihek or Guam Micronesian Kingfisher (*Halcyon cinnamomina cinnamomina*)

**Plan Status:** Final Revision 1

**Plan Date:** 14-Nov-08

**Lead Agency:** USFWS

**Lead Office:** Pacific Islands Fish And Wildlife Office

(1808)

(792-9400 )

Species	Action Priority #	Action #	Action Description	Action Status	Est. Initiation Date	Est. Completion Date	Responsible Parties	Work Type	Labor Type	Action Comments
Guam Micronesian kingfisher ( <i>Halcyon cinnamomina cinnamomina</i> )	3	1.1	Maintain an active Recovery Committee	Ongoing Not Current	FY 2000 - FY 2004		U.S. Fish and Wildlife Service	Other: Administration	Internal Administrative	
Guam Micronesian kingfisher ( <i>Halcyon cinnamomina cinnamomina</i> )	3	1.1.1	Coordinate recovery actions with other conservation efforts	Ongoing Current	FY 2000 - FY 2004		U.S. Fish and Wildlife Service	Other: Administration	Internal Administrative	
Guam Micronesian kingfisher ( <i>Halcyon cinnamomina cinnamomina</i> )	3	1.1.2	Develop 5-year recovery milestones	Partially Complete	FY 2009		Guam Micronesian Kingfisher Recovery Committee, U.S. Fish and Wildlife Service	Other: Administration	Internal Administrative	
Guam Micronesian kingfisher ( <i>Halcyon cinnamomina cinnamomina</i> )	3	1.1.3	Review recovery efforts annually	Ongoing Current	FY 2000 - FY 2004		Guam Micronesian Kingfisher Recovery Committee, U.S. Fish and Wildlife Service	Other: Administration	Internal Administrative	
Guam Micronesian kingfisher ( <i>Halcyon cinnamomina cinnamomina</i> )	3	1.2	Monitor recovery efforts	Ongoing Not Current	FY 2000 - FY 2004		U.S. Fish and Wildlife Service	Other: Administration	Internal Administrative	
Guam Micronesian kingfisher ( <i>Halcyon cinnamomina cinnamomina</i> )	1	2.1	Continue captive population management efforts	Ongoing Current	Prior to FY 1995		Guam Division of Aquatic & Wildlife Resources, Micronesian Kingfisher Species Survival Plan Institutions	Management: Captive Standards and Veterinary Care	Species Expert	
Guam Micronesian kingfisher ( <i>Halcyon cinnamomina cinnamomina</i> )	1	2.2.1	Continue to maintain sihek breeding and holding pens on Guam	Ongoing Current	FY 2000 - FY 2004		Guam Division of Aquatic & Wildlife Resources	Management: Captive Standards and Veterinary Care	Species Expert	
Guam Micronesian kingfisher ( <i>Halcyon cinnamomina cinnamomina</i> )	2	2.2.2	Maintain staffing of Guam facility	Ongoing Current	FY 2000 - FY 2004		Guam Division of Aquatic & Wildlife Resources	Other: Administration	Internal Administrative, Internal Field Assistance	

Species	Action Priority #	Action #	Action Description	Action Status	Est. Initiation Date	Est. Completion Date	Responsible Parties	Work Type	Labor Type	Action Comments
Guam Micronesian kingfisher (Halcyon cinnamomina cinnamomina)	2	2.3.1	Evaluate climate, photoperiod, and reproductive success and modify captive management, as appropriate	Partially Complete	FY 2000 - FY 2004		Micronesian Kingfisher Species Survival Plan Institutions	Research: Propagation	Graduate Student, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina cinnamomina)	2	2.3.10	Collect and analyze pathology data and modify management, as appropriate	Ongoing Current	Prior to FY 1995		Micronesian Kingfisher Species Survival Plan Institutions	Management: Captive Standards and Veterinary Care, Management: Disease Control, Research: Disease	Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina cinnamomina)	1	2.3.11	Continue to prevent disease in captive population	Ongoing Current	Prior to FY 1995		Micronesian Kingfisher Species Survival Plan Institutions	Management: Captive Standards and Veterinary Care	Species Expert	
Guam Micronesian kingfisher (Halcyon cinnamomina cinnamomina)	2	2.3.12	Continue to standardize husbandry techniques and training	Ongoing Current	FY 1995 - FY 1999		Micronesian Kingfisher Species Survival Plan Institutions	Management: Captive Standards and Veterinary Care	Internal Administrative, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina cinnamomina)	2	2.3.2	Evaluate nest logs and reproductive success and modify captive management, as appropriate	Partially Complete	FY 2000 - FY 2004		Guam Division of Aquatic & Wildlife Resources, Micronesian Kingfisher Species Survival Plan Institutions	Management: Captive Standards and Veterinary Care	Graduate Student, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina cinnamomina)	1	2.3.3	Plan transfers of additional sihek to Guam	Ongoing Current	FY 2000 - FY 2004		Guam Division of Aquatic & Wildlife Resources, Micronesian Kingfisher Species Survival Plan Institutions	Management: Captive Standards and Veterinary Care	Species Expert	
Guam Micronesian kingfisher (Halcyon cinnamomina cinnamomina)	2	2.3.3	Assess effects of nutrition on reproductive success and modify captive management as appropriate	Partially Complete	FY 2000 - FY 2004		Micronesian Kingfisher Species Survival Plan Institutions	Management: Captive Standards and Veterinary Care, Research: Dietary Studies	Graduate Student, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina cinnamomina)	2	2.3.4	Assess effects of age on reproductive success and modify captive management, as appropriate	Partially Complete	FY 2000 - FY 2004		Micronesian Kingfisher Species Survival Plan Institutions	Management: Captive Standards and Veterinary Care, Research: Propagation	Graduate Student, Internal Field Assistance	

Species	Action Priority #	Action #	Action Description	Action Status	Est. Initiation Date	Est. Completion Date	Responsible Parties	Work Type	Labor Type	Action Comments
Guam Micronesian kingfisher (Halcyon cinnamomina cinnamomina)	2	2.3.5	Assess effects of hand-rearing on reproductive success, and modify management, as appropriate	Partially Complete	FY 2000 - FY 2004		Micronesian Kingfisher Species Survival Plan Institutions	Management: Captive Standards and Veterinary Care, Research: Propagation	Graduate Student, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina cinnamomina)	2	2.3.6	Develop methods to establish pairs and implement, as appropriate	Ongoing Current	Prior to FY 1995		Guam Division of Aquatic & Wildlife Resources, Micronesian Kingfisher Species Survival Plan Institutions	Management: Captive Standards and Veterinary Care, Research: Propagation	Species Expert	
Guam Micronesian kingfisher (Halcyon cinnamomina cinnamomina)	2	2.3.7	Review artificial incubation techniques and modify management, as appropriate	Not Started			Micronesian Kingfisher Species Survival Plan Institutions	Management: Captive Standards and Veterinary Care, Management: Propagation	Graduate Student, Internal Field Assistance, Species Expert	
Guam Micronesian kingfisher (Halcyon cinnamomina cinnamomina)	2	2.3.8	Study chick loss during parent-rearing and modify management, as appropriate	Not Started			Micronesian Kingfisher Species Survival Plan Institutions	Management: Captive Standards and Veterinary Care, Research: Propagation	Graduate Student, Internal Field Assistance, Species Expert	
Guam Micronesian kingfisher (Halcyon cinnamomina cinnamomina)	2	2.3.9	Continue stress hormone research and incorporate results in management, as appropriate	Ongoing Not Current	FY 2000 - FY 2004		Micronesian Kingfisher Species Survival Plan Institutions	Management: Captive Standards and Veterinary Care, Research: Propagation	Graduate Student, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina cinnamomina)	2	3.1.1	Review other reintroduction programs	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Research: Reintroduction	Internal Administrative, Species Expert	
Guam Micronesian kingfisher (Halcyon cinnamomina cinnamomina)	2	3.1.2	Develop and test reintroduction methods on collared kingfishers	Not Started			U.S. Fish and Wildlife Service	Research: Reintroduction	Graduate Student, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina cinnamomina)	2	3.10.1	Gather data on post-release survival of sihek	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Research: Population Assessment	Contract, Graduate Student, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina cinnamomina)	3	3.10.2.1	Update population model (see 3.4) with results from sihek reintroduction	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Research: Population Assessment	Contract, Graduate Student, Internal Technical Assistance, Species Expert	
Guam Micronesian kingfisher (Halcyon cinnamomina cinnamomina)	3	3.10.2.2	Develop efficient survey methods	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Research: Population Surveys	Contract, Internal Technical Assistance	

Species	Action Priority #	Action #	Action Description	Action Status	Est. Initiation Date	Est. Completion Date	Responsible Parties	Work Type	Labor Type	Action Comments
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	3.2	Determine locations of potential release sites on Guam	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Management: Reintroduction	Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	3.2.1.1	Obtain/construct GIS of Guam landscape/vegetation characteristics to support reintroduction planning	Partially Complete	FY 2008		U.S. Fish and Wildlife Service	Management: Reintroduction	Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	3.2.1.2	Evaluate suitability of potential reintroduction sites	Not Started			U.S. Fish and Wildlife Service, U.S. Geological Survey, Biological Resources Discipline	Management: Reintroduction, Research: Reintroduction	Contract, Graduate Student, Internal Field Assistance, Species Expert	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	3.2.2	Assess historical distribution of sihek to support reintroduction planning	Partially Complete	FY 2008		U.S. Fish and Wildlife Service	Research: Reintroduction	Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	3.2.3	Assess brown treesnake densities to support reintroduction planning	Partially Complete	FY 1995 - FY 1999		Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service, U.S. Geological Survey, Biological Resources Discipline	Research: Predation, Research: Reintroduction	Graduate Student, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	3.2.4	Assess food availability to support reintroduction planning	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Research: Dietary Studies, Research: Reintroduction	Contract, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	3.2.5	Assess management potential of release site	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service, U. S. Department of Agriculture - Wildlife Services	Management: Reintroduction	Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	3.3	Work with landowners to develop agreements for sihek release and reestablishment	Not Started			U.S. Fish and Wildlife Service	Management: Identify/Protect Foraging, Breeding and Mig Habitats, Management: Planning, Other: Information and Education	Internal Administrative, Internal Field Assistance	

Species	Action Priority #	Action #	Action Description	Action Status	Est. Initiation Date	Est. Completion Date	Responsible Parties	Work Type	Labor Type	Action Comments
Guam Micronesian kingfisher (Halcyon cinnamomina)	3	3.4	Evaluate sihek dispersal, movement and habitat use	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Research: Habitat Requirements	Contract, Graduate Student, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	3	3.5	Develop a population model	Not Started			U.S. Fish and Wildlife Service	Research: Population Assessment	Contract, Internal Technical Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	3.6	Determine number of sihek needed for successful release	Partially Complete	FY 2010		Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Research: Reintroduction	Contract, Internal Technical Assistance, Species Expert	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	3.7	Develop reintroduction plan for sihek	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Management: Reintroduction	Internal Administrative, Species Expert	
Guam Micronesian kingfisher (Halcyon cinnamomina)	1	3.8.1	Reintroduce sihek to northern Guam	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Management: Reintroduction	Graduate Student, Internal Field Assistance, Internal Technical Assistance, Species Expert	
Guam Micronesian kingfisher (Halcyon cinnamomina)	3	3.8.2	Reintroduce sihek to establish a subpopulation in southern Guam	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Management: Reintroduction	Contract, Internal Field Assistance, Species Expert	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	3.9	Assess the need for wild backup populations outside Guam and establish populations as needed	Ongoing Current	FY 2009		Guam Division of Aquatic & Wildlife Resources, Guam Micronesian Kingfisher Recovery Committee, U.S. Fish and Wildlife Service	Management: Reintroduction, Research: Reintroduction	Internal Administrative	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	4.1.1	Continue and expand efforts to reduce snake populations at reintroduction sites	Not Started			Guam Division of Aquatic & Wildlife Resources, U. S. Department of Agriculture - Wildlife Services	Management: Predator and Competitor Control	Contract, Internal Administrative	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	4.1.2	Delineate snake-threshold densities using surrogate native species	Not Started			U.S. Fish and Wildlife Service, U.S. Geological Survey, Biological Resources Discipline	Research: Predation, Research: Reintroduction	Graduate Student, Internal Field Assistance	

Species	Action Priority #	Action #	Action Description	Action Status	Est. Initiation Date	Est. Completion Date	Responsible Parties	Work Type	Labor Type	Action Comments
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	4.1.3	Refine snake-threshold density estimates for sihek	Not Started			U.S. Fish and Wildlife Service, U.S. Geological Survey, Biological Resources Discipline	Research: Predation, Research: Reintroduction	Graduate Student, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	4.1.4.1	Develop effective artificial attractants for snakes to support reintroduction efforts	Ongoing Not Current	Prior to FY 1995		U. S. Department of Agriculture - Wildlife Services, U.S. Geological Survey, Biological Resources Discipline	Research: Predation, Research: Reintroduction	Graduate Student, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	4.1.4.2	Improve trap designs to increase snake capture rate to support reintroduction efforts	Ongoing Not Current	Prior to FY 1995		U. S. Department of Agriculture - Wildlife Services, U.S. Geological Survey, Biological Resources Discipline	Research: Predation, Research: Reintroduction	Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	4.1.4.3	Develop methods for controlling or eliminating brown treesnakes inside & outside exclosures to support reintroduction	Ongoing Not Current	Prior to FY 1995		U. S. Department of Agriculture - Wildlife Services, U.S. Geological Survey, Biological Resources Discipline	Management: Predator and Competitor Control	Graduate Student, Internal Administrative, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	4.1.4.4	Develop "kingfisher safe" acetaminophen bait stations to support snake control efforts	Not Started			U. S. Department of Agriculture - Wildlife Services	Management: Predator and Competitor Control, Research: Predation	Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	4.1.4.5	Develop methods for quantifying brown treesnake densities in snake-reduced areas	Ongoing Current	FY 2000 - FY 2004		U.S. Geological Survey, Biological Resources Discipline	Research: Predation	Graduate Student, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	4.1.4.6	Develop and test new snake barrier designs	Partially Complete	FY 1995 - FY 1999		U.S. Geological Survey, Biological Resources Discipline	Research: Predation	Graduate Student, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	4.1.5	Continue to fund research to develop new snake control techniques	Ongoing Not Current	Prior to FY 1995		U.S. Fish and Wildlife Service, U.S. Air Force, U.S. Navy	Research: Predation	Contract	
Guam Micronesian kingfisher (Halcyon cinnamomina)	3	4.2	Monitor direct and indirect impacts of rats on sihek to determine the need for rat control	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Research: Predation	Contract, Internal Field Assistance	

Species	Action Priority #	Action #	Action Description	Action Status	Est. Initiation Date	Est. Completion Date	Responsible Parties	Work Type	Labor Type	Action Comments
Guam Micronesian kingfisher (Halcyon cinnamomina)	3	4.3	Assess impact of other sihek predators	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Research: Predation	Contract, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	4.4	Prevent accidental or intentional introduction of new avian predators to Guam	Ongoing Current	Prior to FY 1995		Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Management: Predator and Competitor Control	Internal Administrative, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	3	4.5	Assess the need for black drongo control	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Research: Competition	Contract, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	4.6	Reduce potential impacts of avian disease on sihek populations	Ongoing Not Current	Prior to FY 1995		Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service, U. S. Department of Agriculture - Wildlife Services	Management: Disease Control	Internal Administrative, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	4.8.1	Manage the Guam National Wildlife Refuge fee simple and overlay lands for sihek conservation	Planned			U.S. Fish and Wildlife Service, U.S. Air Force, U.S. Navy	Management: Identify/Protect Foraging, Breeding and Mig Habitats, Management: Land Use	Contract, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	4.8.2	Manage and protect Government of Guam Conservation Areas for sihek conservation	Not Started			Guam Division of Aquatic & Wildlife Resources	Management: Identify/Protect Foraging, Breeding and Mig Habitats, Management: Land Use	Internal Administrative, Internal Field Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	4.9.1	Assess suitability of sihek habitat on Guam	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service, U.S. Air Force, U.S. Navy	Research: Habitat Status	Internal Field Assistance, Species Expert	
Guam Micronesian kingfisher (Halcyon cinnamomina)	2	4.9.2	Develop and implement habitat management plan	Partially Complete	FY 2006		Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service, U.S. Air Force, U.S. Navy	Management: Habitat Maintenance and Manipulation, Management: Identify/Protect Foraging, Breeding and Mig Habitats, Management: Land Use	Contract, Internal Administrative, Internal Field Assistance	

Species	Action Priority #	Action #	Action Description	Action Status	Est. Initiation Date	Est. Completion Date	Responsible Parties	Work Type	Labor Type	Action Comments
Guam Micronesian kingfisher (Halcyon cinnamomina)	3	5.1.1.1	Institute curriculum programs for elementary & high school teachers	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Other: Information and Education	Contract, Internal Technical Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	3	5.1.1.2.1	Work with local teachers to develop lessons on native species and ecosystems	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Other: Information and Education	Internal Administrative, Internal Technical Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	3	5.1.1.2.2	Make educational materials easily available	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Other: Information and Education	Internal Administrative	
Guam Micronesian kingfisher (Halcyon cinnamomina)	3	5.1.1.2.3	Update and revise materials	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Other: Information and Education	Internal Administrative, Internal Technical Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	3	5.1.2	Create a clearinghouse for information and education materials about Guam's native species	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Other: Information and Education	Contract, Internal Administrative	
Guam Micronesian kingfisher (Halcyon cinnamomina)	3	5.1.3	Continue to provide information and promote awareness of the harmful effects of alien species to native species and ecosystems	Ongoing Current	Prior to FY 1995		Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Other: Information and Education	Internal Administrative, Internal Technical Assistance	
Guam Micronesian kingfisher (Halcyon cinnamomina)	3	5.2.1.1	Support conservation outreach organizations to promote conservation at a "grassroots" level	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Other: Information and Education	Internal Administrative	
Guam Micronesian kingfisher (Halcyon cinnamomina)	3	5.2.1.2	Develop a "mentor" program . . .	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Other: Information and Education	Internal Administrative	
Guam Micronesian kingfisher (Halcyon cinnamomina)	3	5.2.1.3	Support the use of volunteers . . .	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Other: Administration, Other: Information and Education	Internal Administrative	



Species	Action Priority #	Action #	Action Description	Action Status	Est. Initiation Date	Est. Completion Date	Responsible Parties	Work Type	Labor Type	Action Comments
Guam Micronesian kingfisher (Halcyon cinnamomina cinnamomina)	3	5.2.2	Develop and support partnerships	Not Started			Guam Division of Aquatic & Wildlife Resources, U.S. Fish and Wildlife Service	Other: Administration, Other: Information and Education	Internal Administrative	